

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-293850

(43)Date of publication of application : 20.10.2000

(51)Int.Cl.

G11B 7/004  
G11B 20/18

(21)Application number : 11-101989

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(22)Date of filing : 09.04.1999

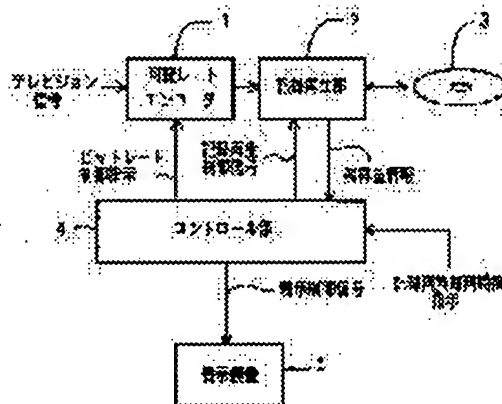
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## (54) INFORMATION SIGNAL RECORDING AND REPRODUCING DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To report recording enable time by measuring a defect in the outer peripheral area of a recording medium precisely in comparison with middle and inner peripheral areas by reproducing recorded signals or recording and reproducing information while using a recording and reproducing means and a control means while the recording medium is not protected by a cartridge.

**SOLUTION:** When an object optical disk 3 is loaded, after it is discriminated whether the optical disk 3 is protected by the cartridge or not, the defects in the inner and middle peripheral areas of the optical disk 3 are measured. At the time of measuring the inner and middle peripheries, measuring time is shortened by skip defect measurement. Next, the defect in the area outside the predetermined radius of an outer periphery rather than the outer peripheral radius of the optical disk 3 is precisely measured. While using the measured result and the management information of the disk 3, the non-recorded capacity of the disk 3 is found and recording enable time with the remaining capacity is displayed on a display device 5.



## LEGAL STATUS

[Date of request for examination]

02.03.2006

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

[Field of the Invention] This invention compresses the image information included in an information signal at a predetermined rate, and relates to the information signal record regenerative apparatus which records on a disc-like record medium and is reproduced.

[0002]

[Description of the Prior Art] As a record medium, DVD is already known well and the disk only for playbacks which encoded and recorded the video signal by the MPEG coding method is already marketed. Moreover, the method of realizing the goods for general (consumer product) which record a video signal on a disk and are reproduced using semiconductor laser is in the middle of development.

[0003] In case high efficiency coding of the video signal is carried out, the method which changes the amount of signs after coding according to the complexity of an image, records on a record medium, and is reproduced is well-known in DVD relation as an adjustable rate method. In case a video signal is recorded by the adjustable rate method, a degree of freedom is large in the relation between the image quality and storage capacity by coding/decryption, and chart lasting time.

[0004] By the board only for playbacks, when loading a regenerative apparatus as known for DVD, a cartridge (disk case) is not used for the disk by which high efficiency coding of the video signal is carried out, and it is recorded. However, it may not use by the disk recorded in a user's hand using semiconductor laser, using a cartridge. Instead of a disk being protected from defects, such as a fingerprint and a blemish, as for the former -- a record medium and a record regenerative apparatus -- the part of a cartridge -- there is a fault referred to as becoming large. The latter is the reverse.

[0005] Usually, record is performed in a clean room and, as for the board only for playbacks, record playback of the effective information is carried out continuously. However, as for the disk which carries out record playback in a user's hand using semiconductor laser, the defect on a disk (the inside of a disk is also included) degrades record reproducibility ability. Rather than the time of reproducing the board only for playbacks, it is severe in the direction in the case of carrying out record playback of the disk which carries out record playback to a duplex, and the effect of this degradation influences. The defect on a disk is because it becomes 2 times of bad influences, at the time of record and playback, by the record playback board to being 1 time of a bad influence at the time of playback in the board only for playbacks.

[0006] At the time of record of the record playback board, owing to, the partial defect by the fingerprint on a disk or other defects performs defect processing, when record is out of condition. As defect processing, the slip processing recorded immediately after or the alternative processing recorded on the location on which it decided independently is an example of a type. Since the defect processing time of the latter containing the access time is large, in many cases, it uses slip processing in record of a video signal.

[0007] At the time of initial actuation of a record playback board system, the conventional technique about which performs a write-in test, or interprets an alternative managed table intelligibly in the test

block field in a disk, and records on a cartridge front face, and a user is told is indicated by JP,8-129458,A. Moreover, in order that a recording device may enable it to grasp that the sensibility properties of a disc-like record medium etc. differ on inner circumference and a periphery, the conventional technique of a disk in which the test-record zone was established in the both sides of a most-inner-circumference field and an outermost periphery field is known.

[0008]

[Problem(s) to be Solved by the Invention] When using the disk for record without a cartridge, or when there is a cartridge and it takes out and uses the disk for record from the cartridge, compared with the case where it uses by entering a cartridge, a fingerprint, a blemish, a contaminant, etc. tend to be attached to a disk, and those effects become large.

[0009] Moreover, when using without a cartridge, or when there is a cartridge and it takes out and uses the disk for record from the cartridge, generally the amounts to which the fingerprint, the blemish, the contaminant, etc. are attached to the disk differ greatly by the case where he is Ushiro by whom the case where a disk is immediately after the beginning of using newly, and the disk were dealt with in ancient times many times.

[0010] For this reason, in case record playback of the video signal is carried out at the naked disk for record, record image quality \*\*\*\*\* will be large to recordable time amount (recordable remaining capacity), and the defect (error) incidence by the fingerprint, the blemish, a contaminant, etc. will do effect.

[0011] In case this invention was made in view of the point mentioned above and carries out record playback of the video signal at a naked disc-like record medium, it aims at offering the information record regenerative apparatus which can tell a user about the recordable time amount based on the defect measurement result of the record medium concerned.

[0012]

[Means for Solving the Problem] In order to attain said purpose, in the information signal record regenerative apparatus concerning this invention, in the nakedness condition that the record medium is not protected by the cartridge, compared with an inside periphery and an inner circumference field, defect measurement of the periphery field of a record medium is carried out finely, and the signal for displaying the recordable time amount to a record medium on a display means based on the measurement result is generated.

[0013] Namely, a record playback means to be the information signal record regenerative apparatus which according to this invention records information on a disc-like record medium, and reproduces the recorded information, and to perform record regeneration to said record medium, In what has the control means which performs record playback control to said record playback means When said control means is in the nakedness condition that said record medium is not protected by the cartridge Said record playback means and said control means are used. By playback of a record signal Or the measurement means which carries out defect measurement of the periphery field of said record medium finely compared with an inside periphery and an inner circumference field by informational record and playback, An operation means to calculate the recordable time amount to said record medium based on said defect measurement result in a non-record section and/or the appointed record section specified beforehand, The information signal record regenerative apparatus characterized by having a status signal generation means to generate the status signal for displaying said recordable time amount is offered.

[0014] Moreover, the information signal record regenerative apparatus constituted so that the information to record might be compressed at an adjustable rate is the desirable mode of this invention.

[0015] Furthermore, it is the desirable mode of this invention that said status signal generation means also generates collectively the status signal for displaying on an inside periphery and an inner circumference field the mark made to correspond to a contaminant and a blemish while displaying the disk corresponding to a record medium and displaying on the periphery field of the disk concerned the mark to which the fingerprint was made to correspond as a defect measurement result.

[0016] Furthermore, it is the desirable mode of this invention that said measurement means sets the boundary radius of the inside periphery field of said record medium and a periphery field to 5 or more

mm [ 10 ] or less toward a core from the physical outermost periphery of a disk, and measures the set-up periphery field concerned to a precision compared with an inside periphery and an inner circumference field.

[0017]

[Embodiment of the Invention] Hereafter, the information signal record regenerative apparatus concerning the gestalt of operation of this invention is explained to a detail. First, it explains as an information signal record regenerative apparatus of this invention, making a digital videodisc recorder into the example of reference. The storage capacity made into a criterion is 4.7GB as an example, and, in the case of the record rate of an average of 4.7 Mbps(es), can carry out record playback for 133 minutes including [ else / sound signal / a video signal and ].

[0018] Two kinds are considered that the use gestalt of a disc-like record medium observes a cartridge. The 1st makes it possible to usually remove the disk of a nakedness condition from a cartridge exceptionally focusing on use of a cartridge. The 2nd also accepts the record playback machine for the optical disk of a nakedness condition without making a cartridge indispensable. Anyway, there may be an opportunity for a user to treat the optical disk of a nakedness condition.

[0019] In the case of a record mold optical disk, the effect by dirt, such as a fingerprint on the front face of a disk, and the blemish influences as a disc-like record medium recorded with a user's hand more severely than the case of the board only for playbacks. This situation is shown in drawing 3. (a) is a situation of a regenerative signal which it was recorded in the condition that there is no fingerprint, and it is the situation of a regenerative signal influenced of the fingerprint at the time of playback, and (b) was recorded in the condition that there is a fingerprint, and has been influenced of the fingerprint also at the time of playback. (a) is reproduced errorless, a big error generates (b) and the processing corresponding to a defect is required. As mentioned above, at the record playback board, an effective record area will decrease substantially by the disk to which the effect of a fingerprint was large and the fingerprint was attached.

[0020] Inner circumference is a diameter of a start and common disc-like record media, such as CD-R and DVD, go to a periphery with advance of record playback. When a disk with a diameter of 12cm investigates the situation of a fingerprint, as shown in drawing 4, it is understood [ many / to the disk outermost periphery / overwhelmingly ]. When the typical cutting tool error rate of the disk dealt with many times is investigated, it is a periphery radius as shown in drawing 5. - (5 thru/or 10) In 5 or more mm [ 10 ] or less, the error rate is large toward the outside [ mm ], i.e., the outermost periphery to a core.

[0021] On the other hand, in the situation of use of a video disc recorder, it is a disk [ finishing / an image transcription / for 100 minutes as an example ], and when saying whether it is recordable the back, it is an important problem as a numerical example whether it is 17 more minutes and whether it is 33 minutes. This numerical example corresponds, when the radius of 55-58mm is totally destroyed with the fingerprint etc. using the record rate of 4.7Mbps immobilization in the CLV record board, and when unhurt. In the above, the concrete numerical example explained the importance and effectiveness of incorporating the effect of the fingerprint of the periphery section.

[0022] Next, in case record playback of the video signal is carried out at a naked disc-like record medium, the gestalt of the concrete operation by this invention which a user can be told [ this invention ] about the defect or error measurement result of the record medium concerned, and can make recordable time amount predict is explained.

[0023] Drawing 1 is the block diagram showing the main examples of a configuration relevant to this invention about the video disc recorder as an information signal record regenerative apparatus. The inputted television signal is encoded by the adjustable rate encoder 1. In the record playback section 2, record signal processing, regenerative-signal processing, servo processing, etc. are performed to the optical disk 3 as an information signal record medium. The control section 4 performs the record playback control to bit rate control lead and the record playback section 2 to the adjustable rate encoder 1, the display control to a display 5, user interface control, etc. In addition, the control section 4 has CPU (arithmetic and program control) and memory of an illustration abbreviation, an interface, etc., and

operates also as a measurement means, an operation means, and a status signal generation means.

[0024] Next, actuation of the video disc recorder concerning the above-mentioned configuration is explained with reference to the flow chart shown in drawing 2. Drawing 2 is a flow chart which shows the contents of control by the above-mentioned control section 4. First, the start of step S1 is the step to which the recording start instruction appeared with the video disc recorder, or loading of the optical disk 3 was carried out. Step S2 distinguishes whether the object optical disk is protected by the cartridge (disk case) and whether there is any yes. Even if it goes into the cartridge at this time, the optical disk 3 with the hysteresis taken out from the cartridge in the past is classified into the direction which is not protected.

[0025] At step S3, defect measurement of the inner circumference of an optical disk 3 and the inside periphery field is carried out. At this time, carrying out defect inspection of all the trucks requires time amount too much, and since it is not practical, it inspects coarsely at intervals. At step S4, it is the periphery radius of an optical disk 3. - (5 thru/ or 10) Defect measurement of the or more 5 periphery field 10mm or less is carried out toward a core from mm, the outside, i.e., outermost periphery, of the radius the periphery is beforehand decided to be. This field has relatively high possibility of leaving a fingerprint, compared with inner circumference or an inside periphery field, when a user has the optical disk 3 of a nakedness condition by hand. In order to measure this correctly, defect measurement is performed more finely than the time of measurement of inner circumference and an inside periphery.

[0026] Any of the approach of not recording, but performing only playback actuation and calculating an error (defect) incidence forecast in simple from depression of the reflected light etc. are sufficient as defect measurement of step S3 and step S4 the account of a test with the approach which account[ of a test ]-records, is reproduced and measures the error incidence. At step S5, the capacity which has not recorded a disk is calculated using the result of step S3 and S4, and the management information of a disk. Under the present circumstances, in calculating recordable time amount, based on the defect measurement result in the non-record section on a disk, and/or the appointed record section specified beforehand, it considers that the part with a defect is a record improper field, and it is calculated. In addition, the appointed record section specified beforehand is the case where overwrite of the field [ finishing / record / already ] is carried out etc.

[0027] At step S6, using the result of step S5, time amount recordable by remaining capacity is displayed on a display 5, and a user is told about it. Moreover, if the data rate of a record signal is changed, since recordable time amount changes of course, record image quality and chart lasting time tell a user including the relation which is a trade-off (conversion to mutual are possible). In addition, as it has branched at step S2, when the object disk is protected by the cartridge, it can branch like an arrow head and steps S3-S5 can be skipped.

[0028] Next, the example which displays the mark corresponding to a contaminant, a blemish, and a fingerprint on the display 5 other than recordable time amount as a defect measurement result is explained. In this case, the defect (or error) part of the inner circumference field of an optical disk 3 and an inside periphery field draws the mark corresponding to the contaminant and blemish which are not a fingerprint, and the defect (or error) part of a periphery field displays the mark corresponding to a fingerprint, and it tells a user the dirt condition of a disk by said mark made to correspond on a disc-like display.

[0029] Since the test showed that adhesion of a fingerprint could be sharply reduced if cautious of handling of the disk from which the cause of the defect of the periphery section has many fingerprints relatively, and the user is not protected by the cartridge about the fingerprint, it displays intelligibly [ for a user ] about the fingerprint of the disk periphery section, and cautions are demanded from a user. Since it is difficult for this display to make it correspond to the defect measurement measured at steps S1 and S3 exactly, and to carry out defect inspection of the whole surface of a disk finely actually, if an inner circumference field and an inside periphery field are general defects, they will be judged constructively, if a periphery field is a fingerprint, it will be judged constructively and a user will be told about it. As an example, as shown in drawing 6, the general defect of an inner circumference field and an inside periphery field is carried out like the Mie round head, and displays XXX mark and the fingerprint mark

of a periphery field. A user can be told by such division display.

[0030] It is as follows when the information signal record regenerative apparatus of this invention mentioned above is summarized. When using a disc-like record medium without a cartridge, effect measurement of defects, such as a fingerprint of a non-record section, a blemish, and a contaminant, is distinguished and dealt with about the case where also take those with a cartridge out from there and they are used, and the case where it uses by entering a cartridge.

[0031] Moreover, since it turned out about the inner circumference of a disk, the inside periphery, and the periphery field that a periphery field has many fingerprints, this fact is incorporated to prediction of recordable time amount. In order to survey effect of a fingerprint, the value which set the boundary radius of the inside periphery of a disk and a periphery to 5 or more mm [ 10 ] or less inside from the physical outermost periphery of a disk is made into a boundary line, and from this, in inner circumference, defect measurement is performed simply, and it has the sequence measured carefully (finely) on a periphery from this. As a result of this investigating many disks, a fingerprint is the physical periphery radius of a disk. - (5 thru/or 10) It is because it turned out that it is distributed more mostly [ a periphery ] than mm.

[0032] In addition, although the gestalt of the above-mentioned implementation was explained taking the case of DVD, this invention can be developed not only DVD but CD-R, and from now on, or it can apply it to a recordable record medium among the various record media which will be standardized.

[0033]

[Effect of the Invention] As mentioned above, when carrying out record playback of the video signal at a naked disc-like record medium according to this invention, Compared with an inside periphery and an inner circumference field, defect measurement of the periphery field of the record medium concerned is carried out finely. Since it was made to display on a display means the recordable time amount (recordable time amount in a non-record section and/or the appointed record section specified beforehand) to the record medium based on the measurement result A user can be told about the recordable remaining time amount based on the defect measurement result of the record medium concerned at a user, and the measurement duration will also become short.

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[Translation done.]